CLAIMS

What is claimed is:

1. A method for automated system identification comprising:

selecting a model structure;

generating at least one reference signal for input into a system;

retrieving a plurality of input signals and a plurality of output signals from said system;

performing system identification on said model structure using said plurality of input signals, said plurality of output signals, and said at least one reference signal to obtain a point model; and

verifying accuracy of said point model.

2. The method according to claim 1, further comprising:

calculating a cost vector for said model structure; and

selecting a model order based on said cost vector associated with said model structure.

3. The method according to claim 2, wherein said model structure includes at least one model parameter.

4. The method according to claim 1, further comprising:

providing at least one operating condition for said system;

providing a sampling frequency and a frequency bandwidth covered by said model structure; and

defining a plurality of identification experiments according to said at least one operating condition, said sampling frequency, and said frequency bandwidth.

5. The method according to claim 4, wherein said model structure includes a plurality of experimental parameters determined by said plurality of identification experiments.

6. The method according to claim 1, further comprising verifying linearity of said system and detecting non-linear manifestations of said system.

7. The method according to claim 1, further comprising storing said at least one reference signal into a reference table and storing said plurality of input signals and said plurality of output signals into an input/output table.

8. The method according to claim 1, wherein said model structure is selected from a group consisting of finite impulse response (FIR), autoregressive with external input (ARX), autoregressive moving average with external input (ARMAX), autoregressive moving average (ARMA), autoregressive autoregressive with external input (ARARX), autoregressive autoregressive moving average with external input (ARARMAX), output error (OE), Box-Jenkins (BJ), and Ordinary Differential Equations (ODE).

9. The method according to claim 4, further comprising:

performing each identification experiment of said plurality of identification experiments in said system; and

obtaining said plurality of input signals and said plurality of output signals from said each identification experiment.

10. The method according to claim 1, wherein said reference signal is selected from a group consisting of a chirp signal, a pseudo random binary sequence, a sum of sinusoids, and a wavelet.

11. The method according to claim 1, wherein said reference signal is generated to obtain a large output signal-to-noise ratio and to guarantee a linear operation regime for said point model.

12. The method according to claim 1, further comprising:

automatically detecting at least one outlier value in said plurality of output signals; and

removing said at least one outlier value from said plurality of output signals.

13. The method according to claim 12, further comprising replacing said at least one outlier value with a predetermined value calculated using a filter.

14. The method according to claim 12, wherein said detecting further comprises:

building a filter using said plurality of input signals and said plurality of output signals;

computing said at least one outlier value using said filter;

comparing said at least one outlier value with a predetermined threshold value; and

storing said at least one outlier value if said at least one outlier value is greater than said predetermined threshold value.

15. The method according to claim 14, wherein said detecting requires a plurality of iterations, each iteration being related to a time value.

16. The method according to claim 1, wherein said performing further comprises identifying an input/output model and a disturbance model within said point model.

17. The method according to claim 16, wherein said input/output model is unstable and said disturbance model is determined using said input/output model.

18. The method according to claim 16, further comprising calculating an input/output uncertainty parameter within said input/output model, and calculating a disturbance uncertainty parameter within said disturbance model.

19. The method according to claim 1, wherein said verifying further comprises analyzing whether a plurality of innovation signals, derived from said plurality of output signals, are white stochastic signals uncorrelated with past measurements.

20. The method according to claim 2, wherein said verifying further comprises analyzing said plurality of input signals and said plurality of output

signals retrieved using a value of zero for said at least one reference signal and increasing said model order to account for unrepresented system dynamics.

21. The method according to claim 18, wherein said verifying further comprises analyzing frequency regions corresponding to said input/output uncertainty parameter and said disturbance uncertainty parameter and modifying said at least one reference signal by increasing a sweep time corresponding to said frequency regions.

22. A computer readable medium containing executable instructions which, when executed in a processing system, cause said system to perform a method for automated system identification comprising:

selecting a model structure;

generating at least one reference signal for input into a system;

retrieving a plurality of input signals and a plurality of output signals from said system;

performing system identification on said model structure using said plurality of input signals, said plurality of output signals, and said at least one reference signal to obtain a point model; and

verifying accuracy of said point model.

23. The computer readable medium according to claim 22, wherein said method further comprises:

calculating a cost vector for said model structure; and

selecting a model order based on said cost vector associated with said model structure.

24. The computer readable medium according to claim 23, wherein said model structure includes at least one model parameter.

25. The computer readable medium according to claim 22, wherein said method further comprises:

providing at least one operating condition for said system;

providing a sampling frequency and a frequency bandwidth covered by said model structure; and

defining a plurality of identification experiments according to said at least one operating condition, said sampling frequency, and said frequency bandwidth.

26. The computer readable medium according to claim 25, wherein said model structure includes a plurality of experimental parameters determined by said plurality of identification experiments.

27. The computer readable medium according to claim 22, wherein said method further comprises verifying linearity of said system and detecting non-linear manifestations of said system.

28. The computer readable medium according to claim 22, wherein said method further comprises storing said at least one reference signal into a reference table and storing said plurality of input signals and said plurality of output signals into an input/output table.

29. The computer readable medium according to claim 22, wherein said model structure is selected from a group consisting of finite impulse

response (FIR), autoregressive with external input (ARX), autoregressive moving average with external input (ARMAX), autoregressive moving average (ARMA), autoregressive autoregressive with external input (ARARX), autoregressive autoregressive moving average with external input (ARARMAX), output error (OE), Box-Jenkins (BJ), and Ordinary Differential Equations (ODE).

30. The computer readable medium according to claim 25, wherein said method further comprises:

performing each identification experiment of said plurality of identification experiments in said system; and

obtaining said plurality of input signals and said plurality of output signals from said each identification experiment.

31. The computer readable medium according to claim 22, wherein said reference signal is selected from a group consisting of a chirp signal, a pseudo random binary sequence, a sum of sinusoids, and a wavelet.

32. The computer readable medium according to claim 22, wherein said reference signal is generated to obtain maximum output signal-to-noise ratio and to guarantee a linear operation regime for said point model.

33. The computer readable medium according to claim 22, wherein said method further comprises:

automatically detecting at least one outlier value in said plurality of output signals; and

removing said at least one outlier value from said plurality of output signals.

34. The computer readable medium according to claim 33, wherein said method further comprises replacing said at least one outlier value with a predetermined value calculated using a filter.

35. The computer readable medium according to claim 33, wherein said detecting further includes:

building a filter using said plurality of input signals and said plurality of output signals;

computing said at least one outlier value using said filter;

comparing said at least one outlier value with a predetermined threshold value; and

storing said at least one outlier value if said at least one outlier value is greater than said predetermined threshold value.

36. The computer readable medium according to claim 35, wherein said detecting requires a plurality of iterations, each iteration being related to a time value.

37. The computer readable medium according to claim 22, wherein said performing further comprises identifying an input/output model and a disturbance model within said point model.

38. The computer readable medium according to claim 37, wherein said input/output model is unstable and said disturbance model is determined using said input/output model.

39. The computer readable medium according to claim 37, wherein said method further comprises calculating an input/output uncertainty parameter within said input/output model, and calculating a disturbance uncertainty parameter within said disturbance model.

40. The computer readable medium according to claim 22, wherein said verifying further comprises analyzing whether a plurality of innovation signals, derived from said plurality of output signals, are white stochastic signals uncorrelated with past measurements.

41. The computer readable medium according to claim 23, wherein said verifying further comprises analyzing said plurality of input signals and said plurality of output signals retrieved using a value of zero for said at least one reference signal and increasing said model order to account for unrepresented system dynamics.

42. The computer readable medium according to claim 39, wherein said verifying further comprises analyzing frequency regions corresponding to said input/output uncertainty parameter and said disturbance uncertainty parameter and modifying said at least one reference signal by increasing a sweep time corresponding to said frequency regions.

43. An article of manufacture comprising a program storage medium readable by a computer and tangibly embodying at least one program of instructions executable by said computer to perform a method for automated system identification, said method comprising:

selecting a model structure;

generating at least one reference signal for input into a system;

retrieving a plurality of input signals and a plurality of output signals from said system;

performing system identification on said model structure using said plurality of input signals, said plurality of output signals, and said at least one reference signal to obtain a point model; and

verifying accuracy of said point model.

44. The article of manufacture according to claim 43, wherein said method further comprises:

calculating a cost vector for said model structure; and

selecting a model order based on said cost vector associated with said model structure.

45. The article of manufacture according to claim 44, wherein said model structure includes at least one model parameter.

46. The article of manufacture according to claim 43, wherein said method further comprises:

providing at least one operating condition for said system;

providing a sampling frequency and a frequency bandwidth covered by said model structure; and

defining a plurality of identification experiments according to said at least one operating condition, said sampling frequency, and said frequency bandwidth.

47. The article of manufacture according to claim 46, wherein said model structure includes a plurality of experimental parameters determined by said plurality of identification experiments.

48. The article of manufacture according to claim 43, wherein said method further comprises verifying linearity of said system and detecting non-linear manifestations of said system.

49. The article of manufacture according to claim 43, wherein said method further comprises storing said at least one reference signal into a reference table and storing said plurality of input signals and said plurality of output signals into an input/output table.

50. The article of manufacture according to claim 43, wherein said model structure is selected from a group consisting of finite impulse response (FIR), autoregressive with external input (ARX), autoregressive moving average with external input (ARMAX), autoregressive moving average (ARMA), autoregressive autoregressive with external input (ARARX), autoregressive autoregressive moving average with external input (ARARMAX), output error (OE), Box-Jenkins (BJ), and Ordinary Differential Equations (ODE).

51. The article of manufacture according to claim 46, wherein said method further comprises:

performing each identification experiment of said plurality of identification experiments in said system; and

obtaining said plurality of input signals and said plurality of output signals from said each identification experiment.

52. The article of manufacture according to claim 43, wherein said reference signal is selected from a group consisting of a chirp signal, a pseudo random binary sequence, a sum of sinusoids, and a wavelet.

53. The article of manufacture according to claim 43, wherein said reference signal is generated to obtain maximum output signal-to-noise ratio and to guarantee a linear operation regime for said point model.

54. The article of manufacture according to claim 43, wherein said method further comprises:

automatically detecting at least one outlier value in said plurality of output signals; and

removing said at least one outlier value from said plurality of output signals.

55. The article of manufacture according to claim 54, wherein said method further comprises replacing said at least one outlier value with a predetermined value calculated using a filter.

56. The article of manufacture according to claim 54, wherein said detecting further includes:

building a filter using said plurality of input signals and said plurality of output signals;

computing said at least one outlier value using said filter;

comparing said at least one outlier value with a predetermined threshold value; and

storing said at least one outlier value if said at least one outlier value is greater than said predetermined threshold value.

57. The article of manufacture according to claim 56, wherein said detecting requires a plurality of iterations, each iteration being related to a time value.

58. The article of manufacture according to claim 43, wherein said performing further comprises identifying an input/output model and a disturbance model within said point model.

59. The article of manufacture according to claim 58, wherein said input/output model is unstable and said disturbance model is determined using said input/output model.

60. The article of manufacture according to claim 58, wherein said method further comprises calculating an input/output uncertainty parameter within said input/output model, and calculating a disturbance uncertainty parameter within said disturbance model.

61. The article of manufacture according to claim 43, wherein said verifying further comprises analyzing whether a plurality of innovation signals,

derived from said plurality of output signals, are white stochastic signals uncorrelated with past measurements.

62. The article of manufacture according to claim 44, wherein said verifying further comprises analyzing said plurality of input signals and said plurality of output signals retrieved using a value of zero for said at least one reference signal and increasing said model order to account for unrepresented system dynamics.

63. The article of manufacture according to claim 60, wherein said verifying further comprises analyzing frequency regions corresponding to said input/output uncertainty parameter and said disturbance uncertainty parameter and modifying said at least one reference signal by increasing a sweep time corresponding to said frequency regions.

64. A method for automated system identification comprising:

qualifying a system;

performing an identification experiment procedure on said system to obtain a plurality of input signal values and a plurality of output signal values;

filtering said plurality of output signal values to obtain point model data; and

validating a point model obtained using said point model data.

65. The method according to claim 64, wherein said qualifying further comprises:

calculating a cost vector associated with each model structure of a plurality of model structures for said system;

selecting one model structure based on said associated cost vector; and

selecting a model order based on said one model structure and said associated cost vector.

66. The method according to claim 65, wherein said calculating further comprises calculating said cost vector as a function of a risk of local minima factor, characteristic to said system, a computational cost factor, characteristic to said model structure, and an equipment time factor related to a number of identification experiments necessary to obtain said point model.

67. The method according to claim 65, further comprising transmitting said cost vector to a real-time planner module for selection of said one model structure.

68. The method according to claim 65, further comprising transmitting said cost vector to a user for selection of said one model structure.

69. The method according to claim 65, further comprising transmitting said cost vector to a processing module for selection of said one model structure.

70. The method according to claim 65, wherein said one model structure selected further includes at least one model parameter.

71. The method according to claim 65, wherein said qualifying further comprises:

providing at least one operating condition for said system;

providing a sampling frequency and a frequency bandwidth covered by said one model structure selected; and

defining a plurality of identification experiments according to said at least one operating condition, said sampling frequency, and said frequency bandwidth.

72. The method according to claim 71, wherein said one model structure selected further includes at least one experimental parameter determined by said plurality of identification experiments.

73. The method according to claim 64, wherein said qualifying further comprises:

performing at least one qualification test on said system; and

calculating a qualification vector based on said at least one qualification test.

74. The method according to claim 73, wherein said performing said at least one qualification test further comprises:

injecting a first reference signal value into said system to obtain a first output signal value;

injecting a second reference signal value, obtained by scaling said first reference signal value by a predetermined factor, to obtain a second output signal value; and

comparing said first output signal value to said second output signal value to verify linearity of said system and to detect non-linear manifestations of said system.

75. The method according to claim 65, wherein said model structure is selected from a group consisting of finite impulse response (FIR), autoregressive with external input (ARX), autoregressive moving average with external input (ARMAX), autoregressive moving average (ARMA), autoregressive autoregressive with external input (ARARX), autoregressive autoregressive moving average with external input (ARARMAX), output error (OE), Box-Jenkins (BJ), and Ordinary Differential Equations (ODE).

76. The method according to claim 73, further comprising deciding whether said system is qualified based on results from said at least one qualification test and terminating said qualifying if said results are outside of a predetermined range.

77. The method according to claim 71, wherein said performing further comprises:

generating at least one reference signal value for input into said system;

performing each identification experiment of said plurality of identification experiments in said system using said at least one reference signal value; and

obtaining said plurality of input signal values and said plurality of output signal values from said each identification experiment performed.

78. The method according to claim 77, wherein said performing further comprises storing said plurality of input signal values into an input storage device and said plurality of output signal values into an output storage device.

79. The method according to claim 77, wherein said generating said at least one reference signal value is based on at least one model parameter associated with said model structure and at least one experimental parameter associated with said model structure and determined by said plurality of identification experiments.

80. The method according to claim 77, wherein said generating said at least one reference signal value produces maximum output signal-to-noise ratio and guarantees a linear operation regime for said point model.

81. The method according to claim 77, wherein said at least one reference signal includes at least one signal selected from a group consisting of

a chirp signal, a pseudo random binary sequence, a sum of sinusoids, and a wavelet.

82. The method according to claim 77, wherein said performing further comprises storing said at least one reference signal value into a reference storage device.

83. The method according to claim 78, wherein said generating further comprises:

retrieving one output signal value from said output storage device;

dividing said one output signal value by said at least one reference signal value to obtain an input/output gain; and

dividing a predetermined output signal level by the input/output gain to obtain a new reference signal value.

84. The method according to claim 77, wherein said generating is iterative, being performed repetitively for each identification experiment of said plurality of identification experiments.

85. The method according to claim 64, wherein said filtering further comprises:

automatically detecting at least one outlier value in said plurality of output signal values; and

removing said at least one outlier value from said plurality of output signal values.

86. The method according to claim 85, wherein said detecting further comprises:

constructing a filter using said plurality of input signal values and said plurality of output signal values;

computing said at least one outlier value as a difference between a predetermined output signal value corresponding to said filter and one output signal value of said plurality of output signal values;

comparing said at least one outlier value with a predetermined threshold error value; and

storing said at least one outlier value if said at least one outlier value is greater than said predetermined threshold value.

87. The method according to claim 86, wherein said filtering further comprises replacing said at least one outlier value with said predetermined output signal value calculated using said filter.

88. The method according to claim 85, wherein said detecting is iterative, being performed repetitively for a plurality of time values if said at least one outlier value is lower than a predetermined threshold value.

89. The method according to claim 86, wherein said comparing is automatically performed by a real-time planner.

90. The method according to claim 86, wherein said comparing is performed by a user.

91. The method according to claim 86, wherein said comparing is automatically performed by a processing module.

92. The method according to claim 85, further comprising:

removing said plurality of output signal values if said at least one outlier value being removed exceeds a predetermined percentage of said plurality of output signal values; and

iteratively performing said identification experiment procedure and said filtering to obtain new point model data.

93. The method according to claim 64, wherein said validating further comprises:

analyzing whether a plurality of innovation signal values, derived from said plurality of output signal values, correspond to a plurality of white stochastic signal values; and

iteratively performing said identification experiment procedure and said filtering to obtain new point model data if said plurality of innovation signal values do not correspond to said plurality of white stochastic signal values.

94. The method according to claim 64, wherein said validating further comprises:

generating at least one reference signal value for input into said system;

analyzing said plurality of input signal values and said plurality of output signal values retrieved using a zero value for said at least one reference signal value;

calculating output spectral estimates for said plurality of output signal values;

calculating input spectral estimates for said plurality of input signal values;

calculating a transfer function estimate as a ratio of said output spectral estimates and said input spectral estimates;

comparing said transfer function estimate with said point model data; and

iteratively performing said identification experiment procedure and said filtering to obtain new point model data if features of said output spectral estimates and said input spectral estimates are not present in said point model data.

95. The method according to claim 64, further comprising performing an identification on said point model.

96. The method according to claim 95, wherein said performing of said identification further comprises:

identifying an input/output model within said point model, said input/output model being characterized by an input/output transfer function;

identifying a disturbance model within said point model, said disturbance model being characterized by a disturbance transfer function;

assessing stability of said input/output model; and

calculating said disturbance transfer function based on said stability of said input/output model.

97. The method according to claim 96, wherein said input/output model is unstable and said calculating further comprises:

processing said input/output transfer function to obtain at least two stable transfer functions;

calculating a prediction error associated with said system based on said at least two stable transfer functions; and

calculating said disturbance transfer function using said prediction error and said at least two stable transfer functions for a predetermined model structure.

98. The method according to claim 97, wherein said predetermined model structure is selected from a group consisting of finite impulse response (FIR), autoregressive with external input (ARX), autoregressive moving average with external input (ARMAX), autoregressive moving average (ARMA), autoregressive autoregressive with external input (ARARX), autoregressive autoregressive moving average with external input (ARARMAX), output error (OE), Box-Jenkins (BJ), and Ordinary Differential Equations (ODE).

99. A method for qualification of a system comprising:

calculating a cost vector associated with each model structure of a plurality of model structures for said system;

selecting one model structure based on said associated cost vector; and

selecting a model order based on said one model structure and said associated cost vector.

100. The method according to claim 99, wherein said calculating further comprises:

calculating said cost vector as a function of a risk of local minima factor, characteristic to said system;

calculating a computational cost factor, characteristic to said model structure; and

calculating an equipment time factor related to a number of identification experiments necessary to obtain said point model.

101. The method according to claim 99, further comprising transmitting said cost vector to a real-time planner module for selection of said one model structure.

102. The method according to claim 99, further comprising transmitting said cost vector to a user for selection of said one model structure.

103. The method according to claim 99, further comprising transmitting said cost vector to a processing module for selection of said one model structure.

104. The method according to claim 99, wherein said one model structure selected further includes at least one model parameter.

105. The method according to claim 99, further comprising:

providing at least one operating condition for said system;

providing a sampling frequency and a frequency bandwidth covered by said one model structure selected; and

defining a plurality of identification experiments according to said at least one operating condition, said sampling frequency, and said frequency bandwidth.

106. The method according to claim 105, wherein said one model structure selected further includes at least one experimental parameter determined by said plurality of identification experiments.

107. The method according to claim 99, further comprising:

performing at least one qualification test on said system; and

calculating a qualification vector based on said at least one qualification test.

108. The method according to claim 107, wherein said performing said at least one qualification test further comprises:

injecting a first reference signal value into said system to obtain a first output signal value;

injecting a second reference signal value, obtained by scaling said first reference signal value by a predetermined factor, to obtain a second output signal value; and

comparing said first output signal value to said second output signal value to verify linearity of said system and to detect non-linear manifestations of said system.

109. The method according to claim 99, wherein said model structure is selected from a group consisting of finite impulse response (FIR), autoregressive with external input (ARX), autoregressive moving average with external input (ARMAX), autoregressive moving average (ARMA), autoregressive autoregressive with external input (ARARX), autoregressive autoregressive moving average with external input (ARARMAX), output error (OE), Box-Jenkins (BJ), and Ordinary Differential Equations (ODE).

110. The method according to claim 107, further comprising deciding whether said system is qualified based on results from said at least one qualification test and terminating said qualifying if said results are outside of a predetermined range.

111. A method for performing an identification experiment on a system comprising:

generating at least one reference signal value for input into said system;

performing each identification experiment of a plurality of identification experiments in said system using said at least one reference signal value; and

obtaining a plurality of input signal values and a plurality of output signal values from said each identification experiment performed.

112. The method according to claim 111, further comprising storing said plurality of input signal values into an input storage device and said plurality of output signal values into an output storage device.

113. The method according to claim 111, wherein said generating said at least one reference signal value is based on at least one model parameter associated with a model structure of a plurality of model structures associated with said system and at least one experimental parameter associated with said model structure and determined by said plurality of identification experiments.

114. The method according to claim 111, wherein said generating said at least one reference signal value produces maximum output signal-to-noise ratio and guarantees a linear operation regime for said system.

115. The method according to claim 111, wherein said at least one reference signal includes at least one signal selected from a group consisting of a chirp signal, a pseudo random binary sequence, a sum of sinusoids, and a wavelet.

116. The method according to claim 111, further comprising storing said at least one reference signal value into a reference storage device.

117. The method according to claim 112, wherein said generating further comprises:

retrieving one output signal value from said output storage device;

dividing said one output signal value by said at least one reference signal value to obtain an input/output gain; and

dividing a predetermined output signal level by the input/output gain to obtain a new reference signal value.

118. The method according to claim 111, wherein said generating is iterative, being performed repetitively for each identification experiment of said plurality of identification experiments.

119. A method for filtering a plurality of output signal values obtained for a system comprising:

automatically detecting at least one outlier value in said plurality of output signal values; and

removing said at least one outlier value from said plurality of output signal values.

120. The method according to claim 119, wherein said detecting further comprises:

constructing a filter using a plurality of input signal values and said plurality of output signal values;

computing said at least one outlier value as a difference between a predetermined output signal value corresponding to said filter and one output signal value of said plurality of output signal values;

comparing said at least one outlier value with a predetermined threshold error value; and

storing said at least one outlier value if said at least one outlier value is greater than said predetermined threshold value.

121. The method according to claim 120, further comprising replacing said at least one outlier value with said predetermined output signal value calculated using said filter.

122. The method according to claim 119, wherein said detecting is iterative, being performed repetitively for a plurality of time values if said at least one outlier value is lower than a predetermined threshold value.

123. The method according to claim 120, wherein said comparing is automatically performed by a real-time planner.

124. The method according to claim 120, wherein said comparing is performed by a user.

125. The method according to claim 120, wherein said comparing is automatically performed by a processing module.

126. The method according to claim 119, further comprising:

removing said plurality of output signal values if said at least one outlier value being removed exceeds a predetermined percentage of said plurality of output signal values; and

providing a second plurality of output signal values for further processing.

127. A method for validating a point model obtained for a system comprising:

generating at least one reference signal value for input into said system;

performing at least one identification experiment in said system using said at least one reference signal value;

obtaining a plurality of input signal values and a plurality of output signal values from said at least one identification experiment performed;

analyzing a plurality of innovation signal values, derived from said plurality of output signal values; and

validating accuracy of said point model if said plurality of innovation signal values corresponds to a plurality of white stochastic signal values.

128. The method according to claim 127, further comprising:

analyzing said plurality of input signal values and said plurality of output signal values retrieved using a zero value for said at least one reference signal value;

calculating output spectral estimates for said plurality of output signal values;

calculating input spectral estimates for said plurality of input signal values; and

calculating a transfer function estimate as a ratio of said output spectral estimates and said input spectral estimates;

comparing said transfer function estimate with said point model; and

validating accuracy of said point model if features of said output spectral estimates and said input spectral estimates are present in said point model.

129. A method for performing identification on a point model for a system comprising:

identifying an input/output model within said point model, said input/output model being characterized by an input/output transfer function;

identifying a disturbance model within said point model, said disturbance model being characterized by a disturbance transfer function;

assessing stability of said input/output model; and

calculating said disturbance transfer function based on said stability of said input/output model.

130. The method according to claim 129, wherein said input/output model is unstable and said calculating further comprises:

processing said input/output transfer function to obtain at least two stable transfer functions;

calculating a prediction error associated with said system based on said at least two stable transfer functions; and

calculating said disturbance transfer function using said prediction error and said at least two stable transfer functions for a predetermined model structure.

131. The method according to claim 130, wherein said predetermined model structure is selected from a group consisting of finite impulse response (FIR), autoregressive with external input (ARX), autoregressive moving average with external input (ARMAX), autoregressive moving average (ARMA), autoregressive autoregressive with external input (ARARX), autoregressive autoregressive moving average with external input (ARARMAX), output error (OE), Box-Jenkins (BJ), and Ordinary Differential Equations (ODE).

132. A computer readable medium containing executable instructions which, when executed in a processing system, cause said system to perform a method for automated system identification comprising:

qualifying a system;

performing an identification experiment procedure on said system to obtain a plurality of input signal values and a plurality of output signal values;

filtering said plurality of output signal values to obtain point model data; and

validating a point model obtained using said point model data.

133. A computer readable medium containing executable instructions which, when executed in a processing system, cause said system to perform a method for qualification of a system comprising:

calculating a cost vector associated with each model structure of a plurality of model structures for said system;

selecting one model structure based on said associated cost vector; and

selecting a model order based on said one model structure and said associated cost vector.

134. A computer readable medium containing executable instructions which, when executed in a processing system, cause said system to perform a method for performing an identification experiment on a system comprising:

generating at least one reference signal value for input into said system;

performing each identification experiment of a plurality of identification experiments in said system using said at least one reference signal value; and

obtaining a plurality of input signal values and a plurality of output signal values from said each identification experiment performed.

135. A computer readable medium containing executable instructions which, when executed in a processing system, cause said system to perform a method for filtering a plurality of output signal values obtained for a system comprising:

automatically detecting at least one outlier value in said plurality of output signal values; and

removing said at least one outlier value from said plurality of output signal values.

136. A computer readable medium containing executable instructions which, when executed in a processing system, cause said system to perform a method for validating a point model obtained for a system comprising:

generating at least one reference signal value for input into said system;

performing at least one identification experiment in said system using said at least one reference signal value;

obtaining a plurality of input signal values and a plurality of output signal values from said at least one identification experiment performed;

analyzing a plurality of innovation signal values, derived from said plurality of output signal values; and

validating accuracy of said point model if said plurality of innovation signal values corresponds to a plurality of white stochastic signal values.

137. A computer readable medium containing executable instructions which, when executed in a processing system, cause said system to perform a method for performing identification on a point model for a system comprising:

identifying an input/output model within said point model, said input/output model being characterized by an input/output transfer function;

identifying a disturbance model within said point model, said disturbance model being characterized by a disturbance transfer function;

assessing stability of said input/output model; and

calculating said disturbance transfer function based on said stability of said input/output model.